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Exploring the rates of malnutrition risk and related factors among inpatients

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ABSTRACT

Aim: The purpose of the study was to reveal the rates of malnutrition risk among inpatients, to determine those who were not malnourished but became iatrogenically-malnourished, and to identify whether malnutrition was prevented or alleviated among how many patients following enteral/parenteral nutrition.

Materials and Method: We carried out the study with 349 patients hospitalized in internal and surgical medicine wards between March 01-31, 2017 (1 month) at the Medical Faculty Hospital of Kırıkkale University. The data of this descriptive research was gathered using the NRS-2002 test administered at initial admission and in the first and second weeks (for malnutrition screening) and a demographic information form inquiring about patients' demographic characteristics, chronic illnesses, medication, and malignancy status.

Results: The findings revealed the mean age of the patients was 60.1±15.5 years and that 54.4% were males. While 75.1% were hospitalized in internal medicine wards, 24.9% received inpatient treatment in surgical medicine wards. About one-fourth of the patients (24.4%) had malnutrition at first admission: 28.6% in internal medicine wards and 11.5% in surgical medicine wards (p=0.001). Besides, %34.9 of the geriatric group and %16.7 of the non-geriatric group had malnutrition risk, and the difference between the groups was significant (p<0.001). Moreover, there was a significant difference between the male and female patients by malnutrition risk (32.1% vs. 15.1%; p<0.001). The patients in internal medicine and pulmonology wards had significantly increased rates of malnutrition risk in the first week (p=0.001 and p<0.001, respectively). Yet, the second-week evaluations among the patients in these wards and the first-week and second-week evaluations among those in other wards yielded no significant increase in their malnutrition risk.

Conclusion: Overall, the NRS-2002 test revealed considerably high rates of malnutrition risk among the participating inpatients. The risk was found to be significantly higher in the males, geriatric patients, patients with malignancy, and patients in internal medicine wards when compared to the females, non-geriatric patients, patients without malignancy, and patients in pulmonology wards, respectively. Besides, the rates of malnutrition risk significantly increased among the patients in internal medicine and pulmonology wards at the end of the first week. Considering the excess rates of malnutrition risk in the present findings, prioritizing malnutrition risk assessment among all patients admitted may be a simple but effective solution to prevent malnutrition from hindering relevant therapies.

Keywords: Malnutrition risk, NRS-2002, nutritional status

INTRODUCTION

Disease-related malnutrition seems to be a salient health problem in developed and developing countries. Today, more than half of patients hospitalized for various reasons in developed countries have varying degrees of malnutrition (1). Considering national health policies, despite drawing less attention than obesity, malnutrition is at least as common as obesity and closely associated with morbidity and mortality. Due to leading to changes to organ functions, malnutrition contributes to the length of hospital stay, development of complications, recurrent hospital admissions, having to stay in care institutions at an early age, and a reduced life expectancy (2).

Observational and randomized clinical studies previously showed that nutrition preoccupied a substantial place in the onset and progression of diseases and rehabilitation following an illness or trauma (3). Thus, it also significantly boosts healthcare expenditures.

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While the rate of malnutrition varies between 5% and 10% among older adults living independently, it goes up to 30-60% among those living in elderly care institutions. Besides, the prevalence of malnutrition varies between 30-65% in hospitalized older adults (4).

Multiple drug use is likely to cause decreased food intake in approximately 10% of hospitalized older adults (5). Disease-related factors are among the most prominent causes of malnutrition in adults in developed countries. The adverse impacts of diseases are exacerbated by the negative effects of medication, nutritional practices within therapy programs but leading to malnutrition (7), decreased food intake due to the disease, increased protein and energy needs, losses with inflammation (6), and psychosocial factors (7). Disease-related changes to taste and smell, dry mouth, mouth sores, breathing, chewing, and swallowing problems, loss of appetite, and many other accompanying problems contribute to the risk of malnutrition (8).

Poor quality, content, taste, portion size, and energy-protein balance of meals served (7-9), inability to obtain foods due to inflexible meal hours, no snack service (if the patient misses the meal, they are likely to remain hungry until the next meal hour) (10-12), prolonged fasting for diagnostic tests and medical procedures (10-13), no oral feeding or malnutrition for a long time following an operation are shown among the routine practices in a hospital that will increase malnutrition risk (14, 15).

Considering that malnutrition is associated with poor outcomes in hospitalized patients, assessing the nutritional status of these patients at the time of admission seems critical for drafting a relevant treatment plan and reducing the morbidity and mortality of the underlying disease. Poor knowledge of healthcare staff regarding the assessment of nutritional status or malnutrition risk may be recognized as significant causes of hospital malnutrition and delays in diagnosis and treatment (7.8).

MATERIAL AND METHOD

The Ethics Committee for Medical Research at Medical Faculty Kırıkkale University granted ethical approval to our descriptive, epidemiological study (No: 03/07 dated 24.01.2017 - Annex-1).

We recruited a total of 349 patients hospitalized in the internal and surgical medicine wards of the Medical Faculty Hospital of Kırıkkale University between March 01-31, 2017 (1 month). We assessed the malnutrition status of the patients using the NRS-2002 test at initial admission and in the first and second weeks. Patients were then divided into the risk (nutritionally at risk) and healthy (not at risk) groups. We also noted down the rates of malnutrition risk among the patients at their first admissions by wards where they were hospitalized. Moreover, we evaluated whether the healthy group developed malnutrition risk during their hospitalization and whether malnutrition risk improved thanks to treatment and nutritional support among those in the risk group.

Inclusion Criteria

1. Being over 18 years,
2. Being hospitalized for any condition,
3. Voluntary participation in the study.

Exclusion Criteria

1. Being under 18 years,
2. Having no disease,
3. Refusing voluntary participation in the study.

Data Collection Tools

Demographic Information Form: We asked the participants to fill out a demographic information form inquiring about their sex, height, weight, inpatient ward, chronic diseases, medication, and malignancy status (Appendix-2). Prior to the data collection procedure, we obtained written informed consent from the patients.

Nutritional Risk Screening-2002 (NRS-2002): Kondrup et al. developed the NRS-2002 to identify malnutrition, malnutrition risk, and patients who may benefit from nutritional support. In two parts as "nutritional status" and "disease severity," the scale is scored on a scale ranging from "0=No problem" to "3=Severe." One more point is added to the score for patients over 70 years. Patients with a total score of ≥3 are considered to be at risk of malnutrition. The first part inquires whether the patient's body mass index (BMI) is below 20.5, whether they have had weight loss in the last three months, whether they have had a decrease in dietary intake in the previous week, and whether they have severe disease or not (16.17).

BMI Calculation: BMI, the most widely adopted method for determining obesity, is calculated by dividing the body weight by the square of the height in meters. A BMI below 20 is considered underweight, between 20-25 as normal, 25-30 as overweight, 30-40 as obese, and above 40 as extremely obese (18).

Statistical Analysis

Descriptive statistics are summarized as numbers, percentages, means, and standard deviations. We compared the categorical data between the groups using a Chi-square test. Visual (histogram and probability graphs) and analytical (Kolmogorov-Smirnov, Shapiro-Wilk tests) methods were referred to check the

normality of distribution. We then performed a Mann-Whitney U test to compare continuous data with non-normal distribution between the groups. The rates of malnutrition risk among the patients at baseline, week 1, and week 2 were presented as percentages. Then, we compared the changes to the baseline, first-week, and second-week rates of malnutrition risk using McNemar's test. All analyses were performed on the SPSS version 20.0, and a p-value < 0.05 was considered statistically significant.

RESULTS

We recruited 349 patients, 190 (54.4%) males and 159 (45.6%) females, for the study. The mean age of the patients was 60.14±15.57 years. The number of patients hospitalized in wards is shown in **Table 1**.

Table 1. Numbers of patients and wards they were hospitalized

Ward	Number (n)	Percentage (%)
Internal Medicine	111	31.8
Pulmonology	79	22.6
Physiotherapy	60	17.2
Urology	22	6.3
Orthopedics	20	5.7
General Surgery	17	4.9
Cardiology	16	4.6
Brain Surgery	7	2
Neurology	6	1.7
Infectious Diseases	5	1.4
Thoracic Surgery	2	0.6
Otorhinolaryngology	2	0.6
Ophthalmology	1	0.3
Dermatology	1	0.3
Total	349	100

Table 2 presents the number of patients hospitalized in the wards of internal medicine subspecialties.

Tablo 2. Numbers of patients hospitalized in the wards of internal medicine subspecialties

Internal Medicine Subspecialty	Number (n)	Percentage (%)
Gastroenterology	37	33.3
Endocrinology	27	24.3
General Internal Medicine	24	21.6
Oncology	23	20.7
Total	111	100

The findings revealed that 85 (24.4%) patients had a malnutrition risk at hospital admission (score ≥ 3). The patients with malnutrition risk had a significantly higher mean age than those without the risk (p<0.001). Fifty-one (34.9%) of the geriatric group (≥65 years) and 34 (16.7%) of the non-geriatric group (<65 years) had malnutrition risk (p<0.001). While 61 (32.1%) of the male patients had malnutrition risk, it was discovered among 24 (15.1%) of the females (p<0.001). Moreover, the rates of malnutrition risk were significantly higher in those with malignancy compared to their counterparts (p<0.001).

Table 3 shows the data of the risk and healthy groups by NRS-2002.

Table 3. Patients' age, sex, and anthropometric measurements by NRS-2002 at hospital admission

	Malnutrition Risk N/A (NRS-2002 score <3)	Malnutrition Risk Detected (NRS-2002 score ≥3)	p
Age (Years)	58.65±15.39	64.74±15.29	<0.001*
Age group			<0.001**
<65 years	169 (83.3%)	34 (16.7%)	
≥65 years	95 (65.1%)	51 (34.9%)	
Sex			<0.001**
Female	135 (84.9%)	24 (15.1%)	
Male	129 (67.9%)	61 (32.1%)	
Weight (kg)	78.44±15.38	64.51±12.82	<0.001*
BMI (kg/m2)	29.20±6.19	23.01±4.37	<0.001*
Malignancy			<0.001**
Yes	18 (47.4%)	20 (52.6%)	
No	246 (79.1%)	65 (20.9%)	

*Mann Whitney-U test **Chi-square test

While 262 (75.1%) patients were hospitalized in internal medicine wards, 87 (24.9%) were hosted in surgical medicine wards. The baseline examinations revealed malnutrition risk in 75 (28.6%) and 10 (11.5%) inpatients in internal and surgical medicine wards, respectively. The results showed that malnutrition risk among those hospitalized in internal medicine wards was significantly higher at the first admission (baseline) (p=0.001). Yet, we found similar rates of malnutrition risks among the patients hospitalized in both internal and surgical medicine wards in the first and second weeks (p=0.173 and p=0.136, respectively).

Table 4. Comparison of baseline, first-week, and second-week rates of malnutrition risk

	Internal Medicine Wards	Surgical Medicine Wards	p
First Admission			0.001*
At risk of malnutrition	75 (28.6%)	10 (11.5%)	
No risk of malnutrition	187 (71.4%)	77 (88.5%)	
Total (number-percentage)	262 (100%)	87 (100%)	
First Week			0.173*
At risk of malnutrition	86 (40.6%)	22 (31.4%)	
No risk of malnutrition	126 (59.4%)	48 (68.6%)	
Total (number-percentage)	212 (100%)	70 (100%)	
Second Week			0.136*
At risk of malnutrition	40 (43%)	9 (64.3%)	
No risk of malnutrition	53 (57%)	5 (35.7%)	
Total (number-percentage)	93 (100%)	14 (100%)	

*Chi-square test

We detected malnutrition risk at first admission in 51 (34.9%) patients in the geriatric age group (≥65 years). In the first-week examinations, we discovered that 26 (32.5%) older adult patients without malnutrition developed malnutrition risk, while 42 (100%) patients had ongoing risk (p<0.001). When it comes to the second-week examinations, 21 (95.5%) of the older adult patients with malnutrition risk remained at risk, while 3 (16.7%) without malnutrition risk developed malnutrition risk (p=0.625). The rates of malnutrition risk among the patients in the geriatric age group are presented in **Figure 1**.

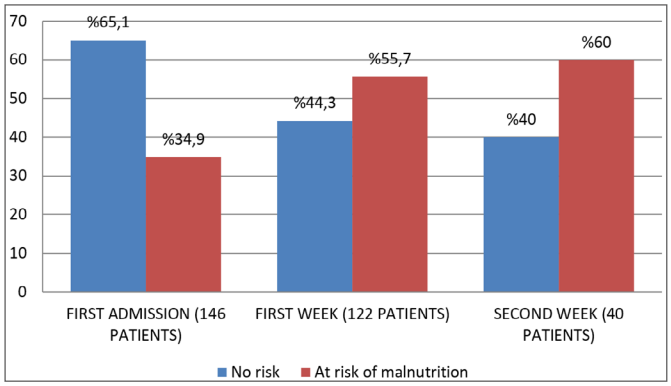

Figure 1. Rates of malnutrition risk among the older adult patients at the first admission and in the first-week and second-week examinations

The findings showed that the rates of malnutrition risk among the inpatients in internal medicine and pulmonology wards significantly increased in the first week (p=0.001 and p<0.001, respectively). Yet, we could not detect a significant increase in malnutrition risk among these patients in the second-week examinations (p=0.99 and p=0.375, respectively). According to the first-week and second-week examinations, there was no increased malnutrition risk among the inpatients in the other wards. **Table 5** demonstrates the total number of patients hospitalized in the wards at the first admission and in the first-week and second-week examinations and the percentages of those with malnutrition risk.

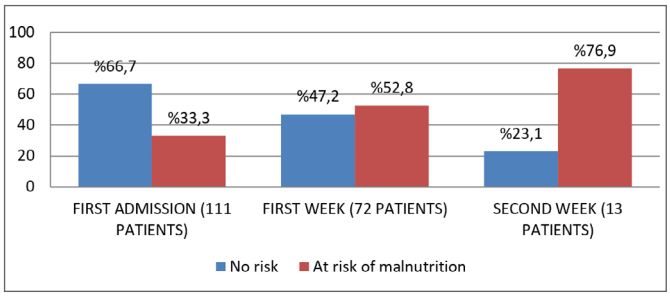

Figure 2. Rates of malnutrition risk in the inpatients in internal medicine wards at the first admission and in the first-week and second-week examinations

Regarding the internal medicine subspecialties, there were no significant changes in malnutrition risk among inpatients in gastroenterology, endocrinology, general internal medicine, and oncology wards from first-week examinations to second-week examinations. **Table 6** shows the numbers of patients in internal medicine wards and their rates of malnutrition risk.

Table 5. Numbers and percentages of patients at risk of malnutrition at the first admission and in the first-week and second-week examinations

Ward	Patients (first admission) (n)	Patients at risk of malnutrition (%)	Patients (first week) (n)	Patients at risk of malnutrition (%)	Patients (second week) (n)	Patients at risk of malnutrition (%)
Internal Medicine	111	%33.3	72	%52.8	13	%76.9
Pulmonology	79	%34.2	74	%52.7	31	%71
Physiotherapy	60	%11.7	58	%12.1	46	%13
Urology	22	%9.1	17	%29.4	1	%100
Orthopedics	20	%5	16	%12.5	2	%50
General Surgery	17	%17.6	14	%57.1	6	%66.7
Cardiology	16	%12.5	14	%28.6	3	%33.3
Brain Surgery	7	%28.6	7	%42.9	1	%100
Neurology	6	%66.7	3	%66.7	1	%100
Infectious Diseases	5	------	4	-------	2	%50
Thoracic Surgery	2	-------	1	------	1	%100
Otorhinolaryngology	2	------	1	------	-------	--------
Ophthalmology	1	------	------	-------	-------	-------
Dermatology	1	-------	1	-------	--------	-------

Table 6. Rates of malnutrition risk in the inpatients in internal medicine wards at the first admission and in the first-week and second-week examinations

Subspecialty Ward	Patients (first admission) (n)	Patients at risk of malnutrition (%)	Patients (first week) (n)	Patients at risk of malnutrition (%)	Patients (second week) (n)	Patients at risk of malnutrition (%)
Gastroenterology	37	%32.4	19	%42.1	2	%66.7
Endocrinology	27	%14.8	15	%33.3	1	%100
General internal medicine	24	%37.5	23	%60.9	7	%85.7
Oncology	23	%52.2	15	%73.3	1	%100

Table 7. Malnutrition risk by chronic disease at the first admission and in the first-week and second-week examinations

Chronic Disease	Patients (first admission) (n)	Patients at risk of malnutrition (%)	Patients (first week) (n)	Patients at risk of malnutrition (%)	Patients (second week) (n)	Patients at risk of malnutrition (%)
DM	119	22.7%	99	43.4%	30	60%
HT	126	23.8%	111	41.4%	35	37.1%
Anemia	156	36.5%	129	60.5%	43	76.7%
COPD	71	39.4%	65	60%	31	74.2%
Chronic kidney disease (CKD)	35	42.9%	32	53.1%	7	85.7%

In the second-week examinations, we discovered that 11 patients were discharged. The remaining three patients were free of malnutrition risk in the first-week examinations. Yet, one of these patients (33%) developed malnutrition risk.

Table 7 shows the percentages of malnutrition risk among the patients by chronic disease at the first admission and in the first-week and second-week examinations.

DISCUSSION

Our findings revealed malnutrition risk in 85 (24.4%) patients (score ≥3) at hospital admission. Korfalı et al. included 29,139 patients hospitalized in 62 hospitals in 19 cities in Turkey between 2005 and 2006 and attempted to determine those at risk of malnutrition using the NRS-2002 test. In their study, malnutrition risk was found in 15% of the patients (19). In a similar study by Imoberdorf et al. (20), 32,837 patients hospitalized between 2003 and 2006 in internal medicine wards of 7 hospitals in Switzerland were evaluated, and it was concluded that 18.2% of the patients had malnutrition risk. The differences between the findings in the aforementioned studies and our research may be attributed to the sample sizes (21). Moreover, exploring the subject at multi centers may have contributed to the diversity of the patient population and led to different malnutrition rates (21). Besides, the fact that 60% of the patients in the study by Korfalı et al. were all those hospitalized in surgical medicine wards for minor surgeries may also explain the different findings between the studies.

We found that while the mean age of hospitalized patients without malnutrition risk was 58.65±15.39 years, it was 64.74±15.29 years among those patients with malnutrition risk. In their study using the NRS-2002 on 266 patients hospitalized in internal medicine wards and intensive care units, Küçükardalı et al. (22) found the mean ages of the patients with and without malnutrition risk to be 38.6±23.6 years and 73.8±14.45 years, respectively. The researchers also reported the difference between the mean ages of the groups to be statistically significant. Pirlich et al. explored malnutrition among patients in internal medicine wards of two German hospitals in 2003 through the Subjective Global Assessment (SGA). Accordingly, they found a significant difference between the mean ages of the patients with (SGA-A; 58.3±15.6 years) and without (SGA-B and SGA-C; 70.0±13.6 years) malnutrition (23).

The multi-center study by Korfalı et al., mentioned earlier, showed that 25% of those over 60 years and 9.3% of those under 60 years were at risk of malnutrition (19). In the present study, we compared the rates of malnutrition risk between the geriatric and non-geriatric groups and concluded that those at risk of malnutrition comprised 16.7% (n=34) of the non-geriatric group and 34.9% (n=51) of the geriatric group. Despite the differences between the age groups compared in our study and the previous research, we may assert that the literature, as well as our study, mentions higher malnutrition risk in older ages.

There were 38 patients hospitalized for malignancy and constituted 10.9% of all participants. Considering the NRS-2002 scores of these patients, we found out that 20 (52.6%) had malnutrition risk. In a study on 1,545 cancer patients with a median age of 59.3±13.8 years in a cancer center in France, Pressoir et al. discovered malnutrition risk to be 30.9% among the patients. It should be noted that the researchers utilized another method suggested by the French health authorities to determine malnutrition (83). Therefore, the differences between the findings may be attributed to methodological, statistical, and sample size differences between the studies (73). In Spain, Segura et al. (24) administered the Scored Patient-Generated Subjective Global Assessment (PG-SGA), a test similar to the SGA, to 781 cancer patients with a median age of 62 years and reported 52% of the patients to be malnourished.

There were 111 inpatients in internal medicine wards, and we found the malnutrition risk among these patients to be 33% at first admission. In their study in 26 hospital departments from 12 countries in Europe and the Middle East, Sorensen et al. (25) administered the NRS-2002 to 5051 patients and found malnutrition rates among the patients to be 51%, 45%, and 44% in three internal medicine wards in Eastern Europe, 67%, 38%, and 11% in three internal medicine wards in the Middle East, and 49%, 46%, 35%, and 16% in four internal medicine wards in Western Europe, respectively. Korfalı et al. (19)

reported that 16.4% of 1,468 patients hospitalized in internal medicine wards had malnutrition risk. The rates of malnutrition risk in the previous research appear to vary widely, from 11% to 67%, which may be due to the heterogeneous distribution of the participating patients by age, gender, and indication for hospitalization

In our study, 27 (34.2%) patients admitted to pulmonology wards had malnutrition risk at first admission, while Korfalı et al. (19) reported it to be 17.8% among 881 patients. Besides, 71 of 349 patients in our study had COPD, and we detected malnutrition risk among 28 (39.4%) of them. In their study, Sorensen et al. discovered that 34% of 125 COPD patients had malnutrition risk (25).

We realized that the rates of malnutrition risk significantly increased in the patients hospitalized in internal medicine and pulmonology wards in the first week. Yet, the second-week examinations did not yield a significant increase in the rates of malnutrition risk among these patients. Similarly, the increase in the rates of malnutrition risk was not found to be significant among the patients in other wards as a result of the first-week and second-week examinations. In their study in Argentina, Wyszynski et al. utilized the SGA on 5,115 patients hospitalized in 38 hospitals in 17 cities and found the rates of malnutrition risk to be 35.8%, 41.3%, 52.0%, and 70.4% among those hospitalized for 1-3 days, 4-7 days, 8-15 days, and more than 15 days, respectively. Thus, the researchers concluded that the probability of being malnourished significantly increased as the number of days hospitalized increased (26). However, some other studies documented that malnutrition increases the length of hospital stay (27, 28-30).

The first-week examinations resulted in the development of malnutrition risk among 14 (29.8%) and 13 (27.1%) patients in internal medicine and pulmonology wards, respectively, without malnutrition risk at first admission. These numbers were recorded as 3 (5.9%) in physiotherapy wards, 3 (20%) in urology wards, 3 (20%) in orthopedy wards, 5 (45.5%) in general surgery wards, 2 (16.7%) in cardiology wards, and 1 (20%) in brain surgery wards. Yet, no patients developed new malnutrition risk at the end of the first week in neurology, infection diseases, thoracic surgery, otolaryngology, and ophthalmology wards. In the study by Korfalı et al., it was shown that malnutrition risk developed for the first time in 6.2% of the patients at the end of a week (19). This lower rate of patients developing malnutrition risk at the end of the first week of hospitalization when compared to that in our study may be because the mentioned study was a multi-center study that was conducted on large sample size and included patients with different reasons of hospitalization.

Of the 349 patients included in our study, 262 (75.1%) were hospitalized in internal medicine wards, while 87 (24.9%) were hosted in surgical medicine wards. At first admission, 75 (28.6%) patients hospitalized in internal medicine wards had malnutrition risk, while this risk was detected among 10 (11.5%) patients in surgical medicine wards. Thus, malnutrition risk was significantly higher among those in internal medicine services at first admission. Alvarez-Hernandez et al. (31) found that 29.2% of 837 patients hospitalized in internal medicine wards were malnourished during initial examinations, whereas 17% of 869 patients in surgical medicine wards were found to be malnourished. The malnutrition rate in patients hospitalized in internal medicine wards was significantly higher in that study, similar to our research.

We detected malnutrition risk among 27 (22.7%) of 119 patients with DM. In Spain, París et al. (32) used the Mini Nutritional Assessment (MNA) on 1,090 diabetic patients and determined that 39.1% had malnutrition risk. In another study in Belgium, Vanderwee et al. studied 2,329 diabetic patients using the MNA and concluded that 31.6% of the participants had malnutrition risk (33). While the mean age of the participants in the study in Spain was 78±7.1 years (90), it was determined as 83.8±5.1 years (33) in the study in Belgium. The numbers of those at risk of malnutrition in both studies were higher than in our study, which may be because the mean age in these studies was found to be higher than that in our study (22, 23, 34, 35) or the mentioned studies employed a different method to determine malnutrition risk (21, 36).

Fifteen (42.9%) patients with CKD had malnutrition risk at first admission. In a study by Qureshi et al. in Sweden on 164 hemodialysis patients using the Subjective Global Nutritional Assessment (SGNA), it was reported that 64% of the patients were malnourished (37). Such a difference between the studies regarding the rates of malnutrition risk may be attributed to utilizing different methods to reveal malnutrition risk among the patients (38).

In our study, 57 (36.5%) of 156 patients with anemia had malnutrition risk at first admission. During the first-week examinations, 129 patients with anemia were still hospitalized. We discovered that 44 (97.8%) of them with malnutrition risk at first admission maintained the risk and that 34 (40.5%) without malnutrition risk developed the risk. Lowrie (37) examined the link between anemia and malnutrition in dialysis patients and reported that anemia and malnutrition occur as a result of an acute inflammatory process. In the same study, the researchers concluded that the possibility of coexistence of anemia and malnutrition is likely

to be high in patients with end-stage renal disease accompanied by heart disease. In their study, Lipschitz et al. (38) investigated the clinical manifestations of malnutrition and documented that the frequency of anemia increased in patients with malnutrition. The prevalence of malnutrition increases in the presence of chronic diseases, which is highly affected by decreased appetite, increased catabolism due to cytokines, and the inability to satisfy the increased metabolic needs due to deteriorated digestion and intestinal absorption (6). Considering the chronic diseases leading to anemia, we may assert that the mentioned diseases can cause malnutrition as well as anemia with the cytokines they produce (39).

We detected malnutrition risk among 30 (23.8%) of 126 patients with HT at first admission. During the first-week examinations, we realized that 111 patients with HT were still hospitalized. In the first week, we found out that 23 (93.1%) of them with malnutrition risk at first admission maintained the risk and that 19 (23.2%) without malnutrition risk developed the risk. In their study utilizing the SGNA, Chakravarty et al. (40) calculated the rate of malnutrition risk to be 48% among those with HT hospitalized in an intensive care unit. Although the researchers concluded a higher rate of malnutrition risk compared to our research, it should be noted that they studied only patients hospitalized in an intensive care unit. Pirlich et al. (23) concluded that the probability of developing malnutrition in patients with heart failure was over 30%. Yet, this finding may not be compared with our results since we explored the frequency of malnutrition risk in patients with HT. However, considering the pathophysiological relationship between hypertension and heart failure (41), the result of the mentioned study overlaps ours.

Limitations

The present study is not free of a few limitations. It was single-center research recruiting a relatively small sample size, and patient follow-up was short. Moreover, the participants did not show a homogenous distribution by wards where they were hosted.

CONCLUSION

Considering the high rate of malnutrition risk in our study, all hospitalized patients may need to be evaluated in terms of malnutrition risk through the NRS-2002, a practical method. Pursuing indications and duration of hospitalization well, attempting to detect malnutrition risk early, and engaging in necessary precautions and appropriate treatments are likely to help prevent redundant expenses and health problems due to complications following malnutrition.

ETHICAL DECLARATIONS

Ethics Committee Approval: (For research articles) This study was approved by the clinical research ethics committee of the of Kırıkkale University Medical School. Date: 24/01/2017, number: file number 03/07

Informed Consent: Verbal and written informed consents were obtained from participants

Conflict of Interest: No Conflict of Interest

Financial Disclosure: None

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper and that they have approved the final version

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